*Caltrans Fault Database (V2a) for ARS Online*

*By Martha Merriam (Oct. 23, 2012)*

Requirements for faults to be included in the Caltrans Fault Database (Version 2a) continue to be late-Quaternary in age (per the California Geological Survey [Jennings and Bryant, 2010] definition of active in the past 700,000 years) or younger, and capable of producing an earthquake greater than magnitude 6 when evaluated deterministically.

Fault parameters including location, style, geometry, and activity are the subject of on-going study and require periodic update to reflect the latest information. Although the final responsibility for the design spectrum rests with the geo-professional, every effort is made to keep the Caltrans Fault Database (CFD) accurate and current. Caltrans strives to follow USGS/CGS recommended source models, which are planned for update every four years. However, since Caltrans is a user of seismic hazards research and is an agency which addresses public safety, the Caltrans Fault Database requires more frequent updates. Major updates to the CFD will be documented with a new version number and minor updates being listed with a letter (e.g. CFD Version 2b).

CFD Version 2a builds on the original (2007) version of the database using the same faults and fault parameters of roughly half of those faults. Most of the remaining faults and fault parameters included in CFD Version 2a are from a draft of the Uniform California Earthquake Rupture Forecast –Version 3 (UCERF 3) which include recommendations for California earthquake sources models

Faults added in CFD Version 2a include the recently identified Polaris fault north of Truckee and the Shoreline fault offshore from the Diablo Canyon Nuclear Power Plant. The previously identified Kern Canyon fault has also been added since it is now considered to be active. The Cerro Prieto fault in Baja California was added as a result of the 2010 El Major- Cucapah M7.2 Earthquake. In the Bay Area, the Contra Costa Shear Zone a portion of which was included in Version 1 (Southampton fault), has been expanded based on recent consultant work. Southern California offshore data, recently obtained by the USGS, the Southern California Earthquake Center (SCEC), and others, have resulted in revised parameters for several offshore faults. More changes to offshore fault parameters will occur as work continues in this area of active study. We have maintained the Eastern California Shear Zone areal seismic source (ECSZ), and now include four zones of seismicity simplified as lines in southern California, the Fontana Seismic Trend and the Joshua Tree, Lake Isabella, and Yorba Linda zones of seismicity. Several faults in CFD Version 1 were not included because of they do not meet Caltrans' requirements for inclusion.

Caltrans Fault Database 2a is available under *Technical References* on the ARS Online page. This single electronic file consists of three tabulated spreadsheets:

1. Caltrans Fault Database Version 2a
2. Notes and Reference Numbers
3. References

Please also note the following:

1. Note that slight differences between names of faults in the 2007 database and 2012 database are common.
2. **Since the fault traces are simplified with potential errors of a mile or more (see Figure 1), traces should <u>not</u> be used for surface fault rupture evaluation.**

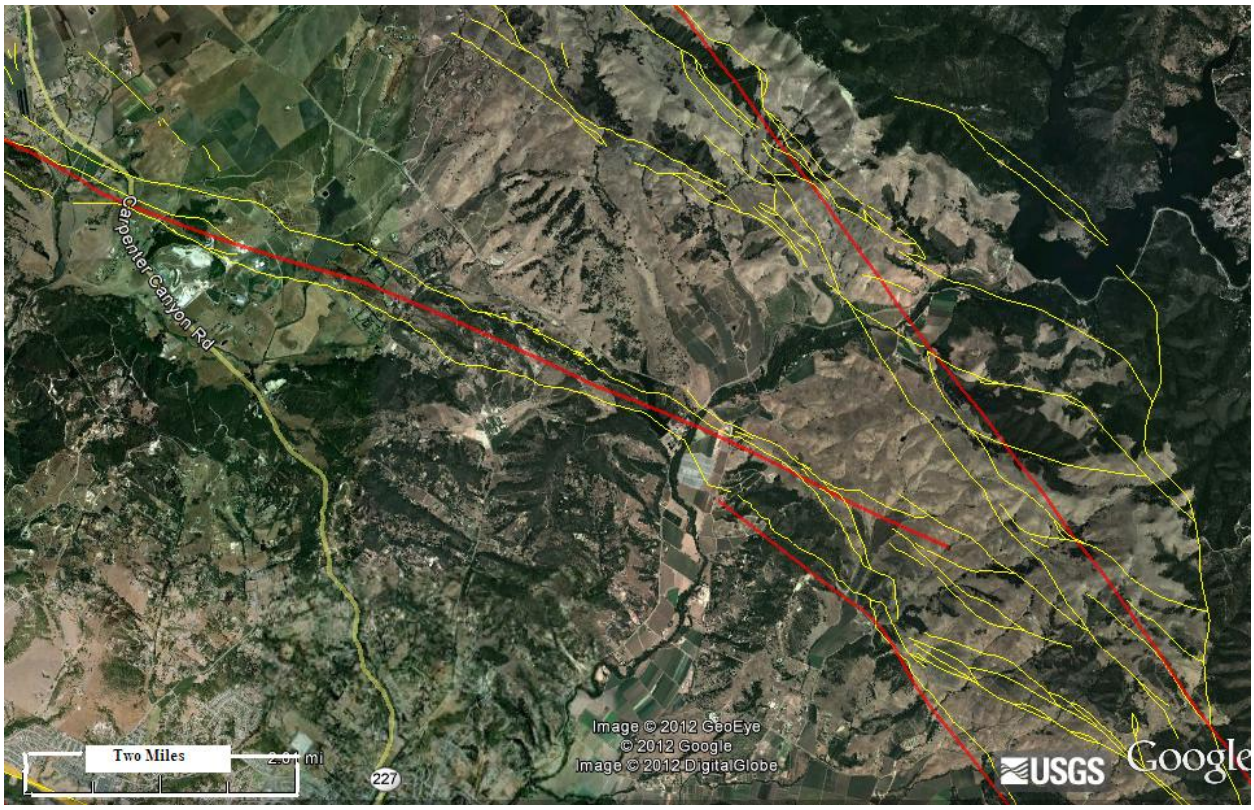


Figure 1. Simplification of faults south of San Luis Obispo. Simplified traces used in ARS Online are shown in red; actual mapped traces are in yellow.

References:

Jennings, C.W., and Bryant, W.A., 2010, Fault activity map of California: California Geological Survey Geologic Data Map No. 6, map scale 1:750,000: http://www.conservation.ca.gov/cgs/cgs_history/Pages/2010_faultmap.aspx

Working Group on California Earthquake Predictions (WGCEP), Uniform California Earthquake Rupture Forecast v.3 http://www.wgcep.org/components-deformation_model_3x